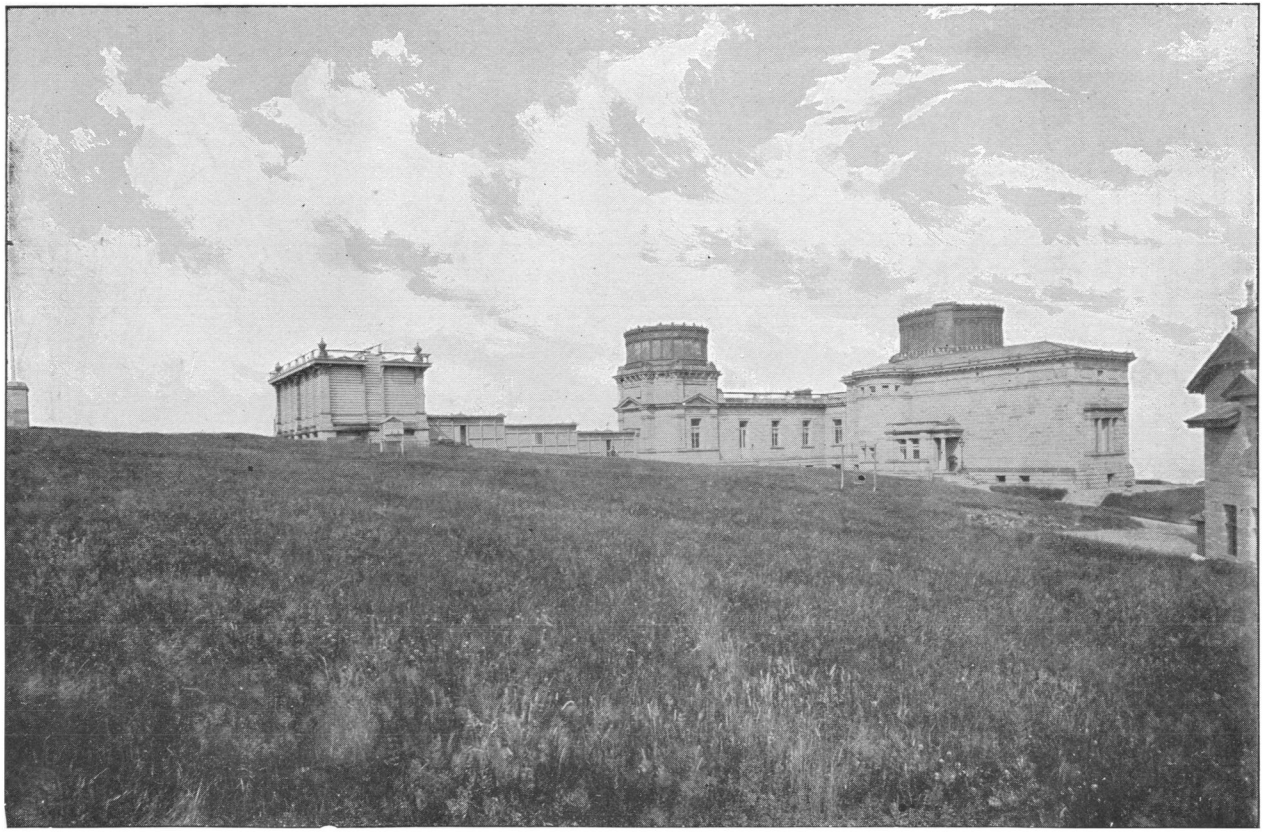


THE ROYAL OBSERVATORY, EDINBURGH, FROM THE SOUTHWEST.

The latitude observations themselves show that the instrument as it stands is not well adapted for use as a zenith telescope. As it is now arranged, much time is lost in reversal, and the greatest care must be taken, else the latitude level, which is a later addition, will strike the clamp. The fact that the level-tube must be greatly inclined to the horizon in reversing, is most objectionable, as errors are almost certain to be introduced. With some arrangement by which the reversal could be easily and rapidly accomplished without altering the inclination of the telescope, this instrument would doubtless give good results in latitude work.

In all, after rejecting numerous obviously erroneous observations, 116 were used.

The resulting value of the latitude of the transit instrument was found to be 37° 20′ 24″.4, with the large probable error of ± 0″.31.

UNIVERSITY OF THE PACIFIC,
COLLEGE PARK, CAL., February, 1898.

THE ROYAL OBSERVATORY, EDINBURGH, SCOTLAND.*

BY R. G. AITKEN.

About the middle of 1888 the Earl of Crawford and Balcarres offered to the Government, for use in a national Scottish observatory, the splendid and valuable equipment of his own observatory at Dun Echt.

The Government accepted the gift; but the space available in the Royal Observatory on the Calton Hill being entirely inadequate for the housing of the instruments, a new building became necessary; and eventually the present site of three and one half acres on the eastern slope of Blackford Hill was chosen. The plans of the new observatory were prepared by Mr. W. W. ROBERTSON, of Her Majesty's Board of Works, and the build-

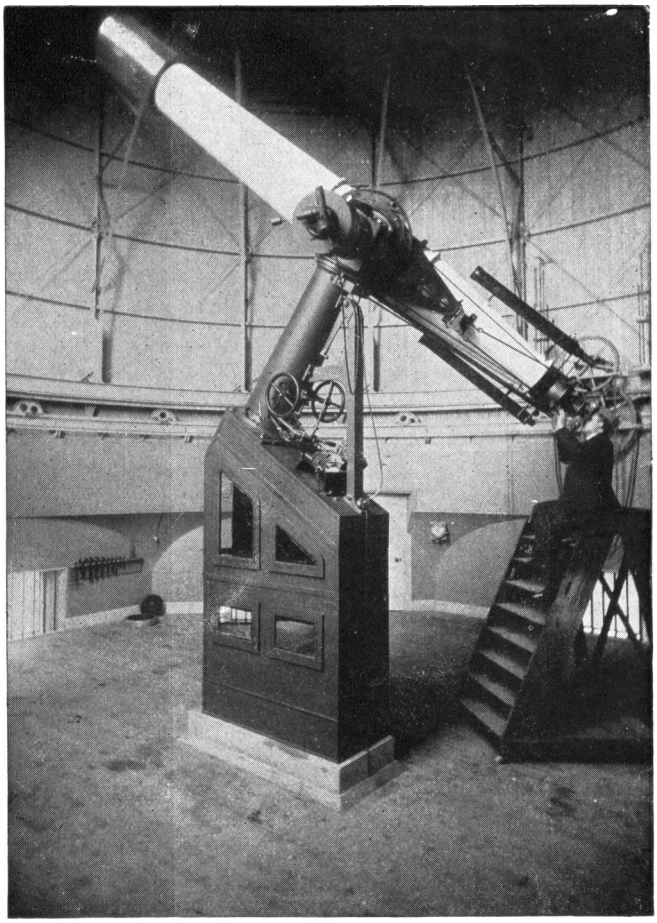
*This description is based upon an article by Mr. THOMAS HEATH, B. A., Assistant Astronomer, Royal Observatory, Edinburgh, read before a meeting of the Royal Scottish Society of Arts, November 23, 1896; a letter from Mr. Heath to Professor HOLDEN; and an article in the *Scotsman*, April 4, 1892. Many of the sentences are directly quoted from one or another of these papers.

ings erected by Messrs. W. and J. KIRKWOOD, of Edinburgh, at a cost, including fittings, of about £34,000.

The buildings consist of an observatory proper and transit house, placed along the north front of the site, and two detached residences for the Astronomer Royal and his assistants. The observatory proper consists of a T-shaped building, with a frontage toward the north of 180 feet. The flat-roofed central buildings are flanked by octagonal towers of unequal size, crowned with cylindrical domes of copper — the larger, 75 feet high and 40 feet in diameter, placed at the east end; and the smaller, 44 feet high and 27 feet in diameter, placed at the west end. These towers contain the two large equatorial telescopes — the 15-inch refractor from the Dun Echt Observatory being placed in the eastern or larger tower, which from its height allows the telescope to sweep the entire horizon; and the 24-inch reflector from the Calton Hill Observatory in the western tower, where it will command the horizon, except for the part cut off by the larger tower. The piers are built of brick, and are hollow, affording room in the larger one for a vault, in which the two standard sidereal clocks are placed, to be protected from any but the most gradual changes of temperature. In addition to this precaution, one of the clocks, known as the Brisbane clock, has also been enclosed in an air-tight case, in order to avoid errors arising from changes of atmospheric pressure. The inner air is partly exhausted until the barometer within the case reads twenty-five inches, at which reading the barometer is to be kept. By the aid of a stuffing box containing quicksilver, the clock is wound without opening the case.

The 15-inch equatorial is completely equipped with the most modern apparatus for every kind of astronomical work — a series of eyepieces of different powers, a micrometer of the most perfect construction, a ZÖLLNER astrophotometer, and several spectroscopes, one of which is among the most powerful in existence. It was with the last-named instrument, designed by himself, that Professor COPELAND was enabled to make the very notable discovery of the presence of helium in the great nebula of *Orion*. Up to the date of this discovery, all that was known of helium was that it caused a certain line to appear in the spectrum of the Sun.

The central range of buildings between the towers is devoted to laboratory rooms for astrophysical work. The flat roof of



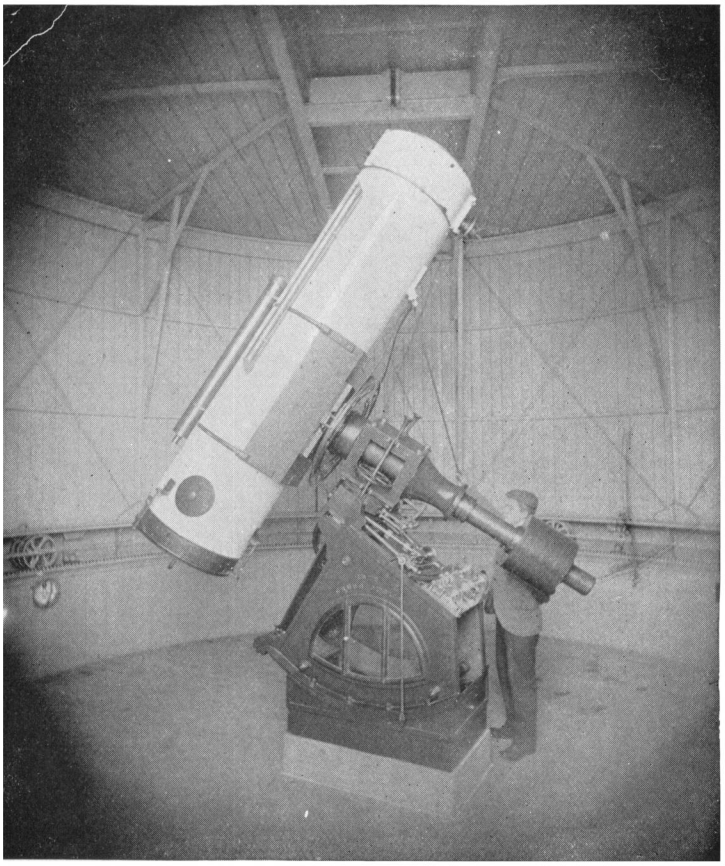
THE 15-INCH EQUATORIAL REFRACTOR.
Royal Observatory, Edinburgh.

this portion of the building facilitates communication between the domes, and affords room for numerous meteorological instruments. On the main floor, beginning at the west end, are, (1) the spectroscopic room, to the south of which, outside the building, is placed a heliostat, by which the Sun's rays are reflected into the apartment through a 10-inch aperture; (2) the experimenting room, shown in one of our illustrations, which has three isolated pillars, supporting the mean time clocks, the dividing engine, the photographic measuring engine, and other instruments for delicate measuring operations; (3) the electric room, containing the large stock of electrical apparatus from the Dun Echt Observatory, the meteorological registering apparatus, etc., and (4) a mechanic's workshop and the chronograph room. The basement is occupied by stores, workshops, and printing room.

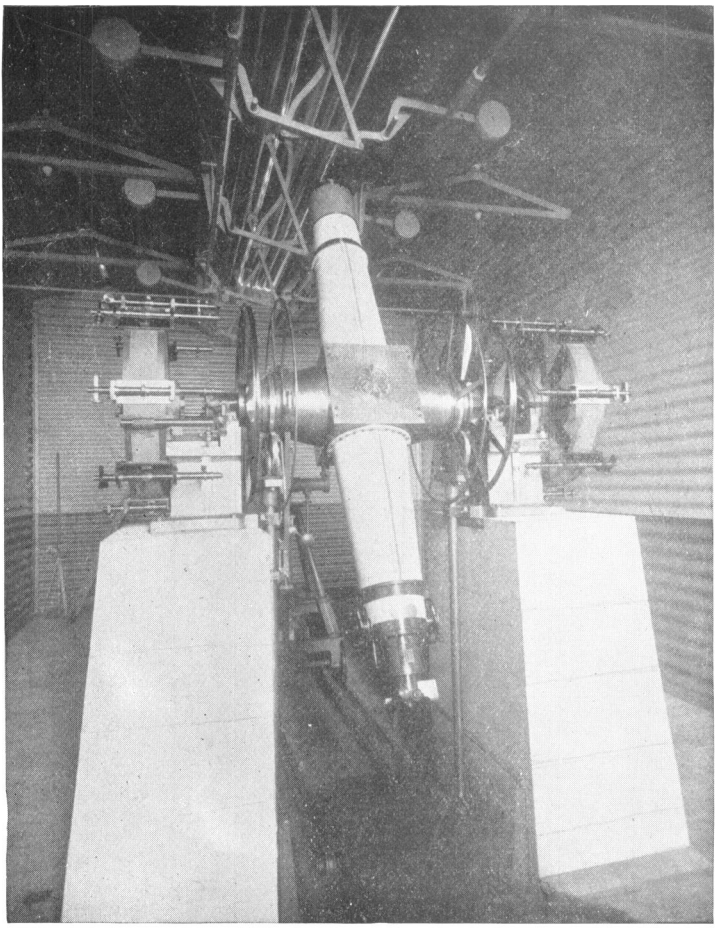
Southward from the central building extends a wing, 80 feet long, 28 feet wide, and having three floors. The basement floor is occupied by the heating plant and rooms for the electric dynamos and accumulators. The principal floor contains the CRAWFORD Library, one of the finest astronomical libraries in the world. Its shelves are specially rich in cometary literature. They contain, also, sets of the scientific publications of most of the astronomical societies and observatories in the world, the majority of the sets being complete from their beginning. Besides the library, this floor contains the Director's rooms and computing rooms. The top floor is one long apartment, used in connection with the 14-inch FOUCAULT siderostat, the hut containing which may be noticed on the central roof in both of the accompanying exterior views.

Eighty feet west from the main building and in line with the northwest front is placed the transit house, which is connected with the main building by a covered way. Here is placed the meridian circle from the Dun Echt Observatory, with telescope of 8.6 inches aperture, and the necessary collimators. This instrument is not exceeded in size and power by any in the world.

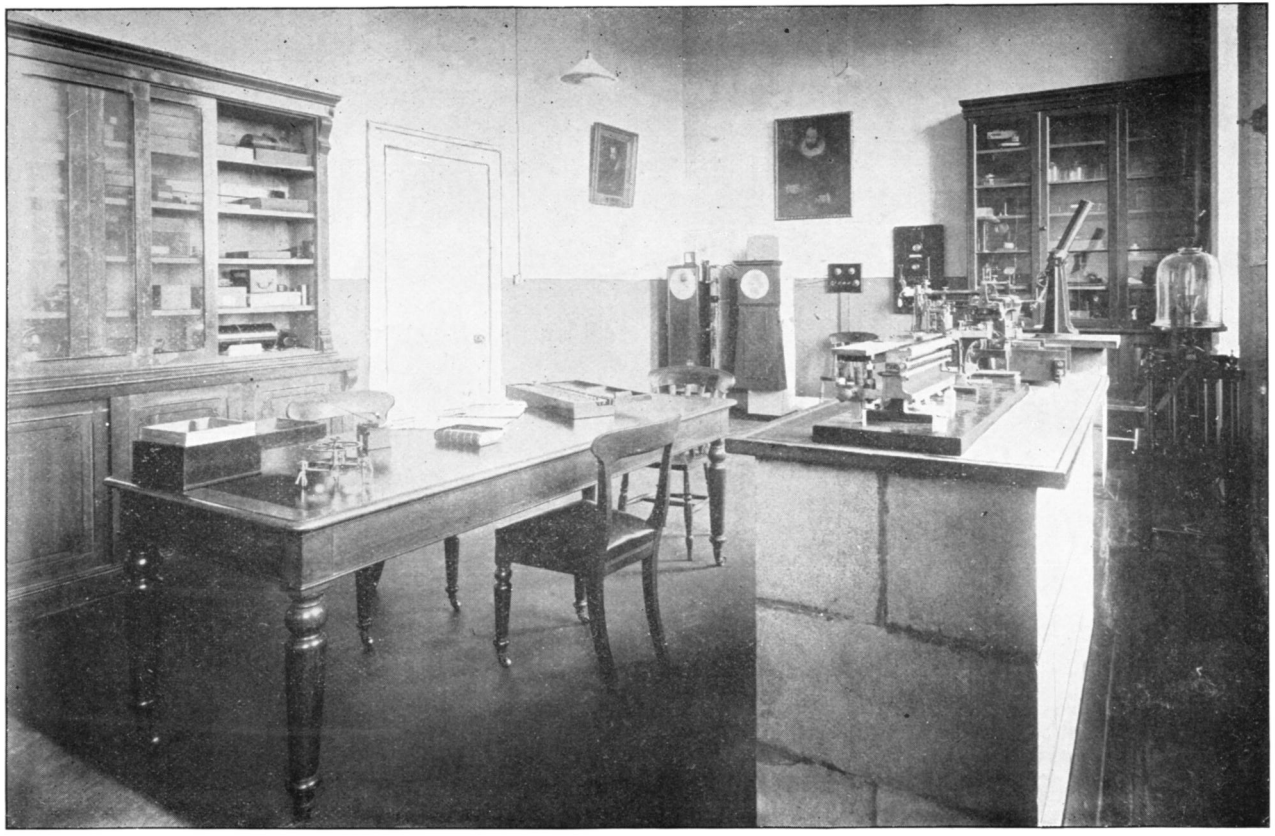
In addition to these instruments the observatory is supplied with a magnificent collection of minor instruments, so that it is completely equipped for the most thorough and advanced astronomical work, and ranks easily as an observatory of the first class.



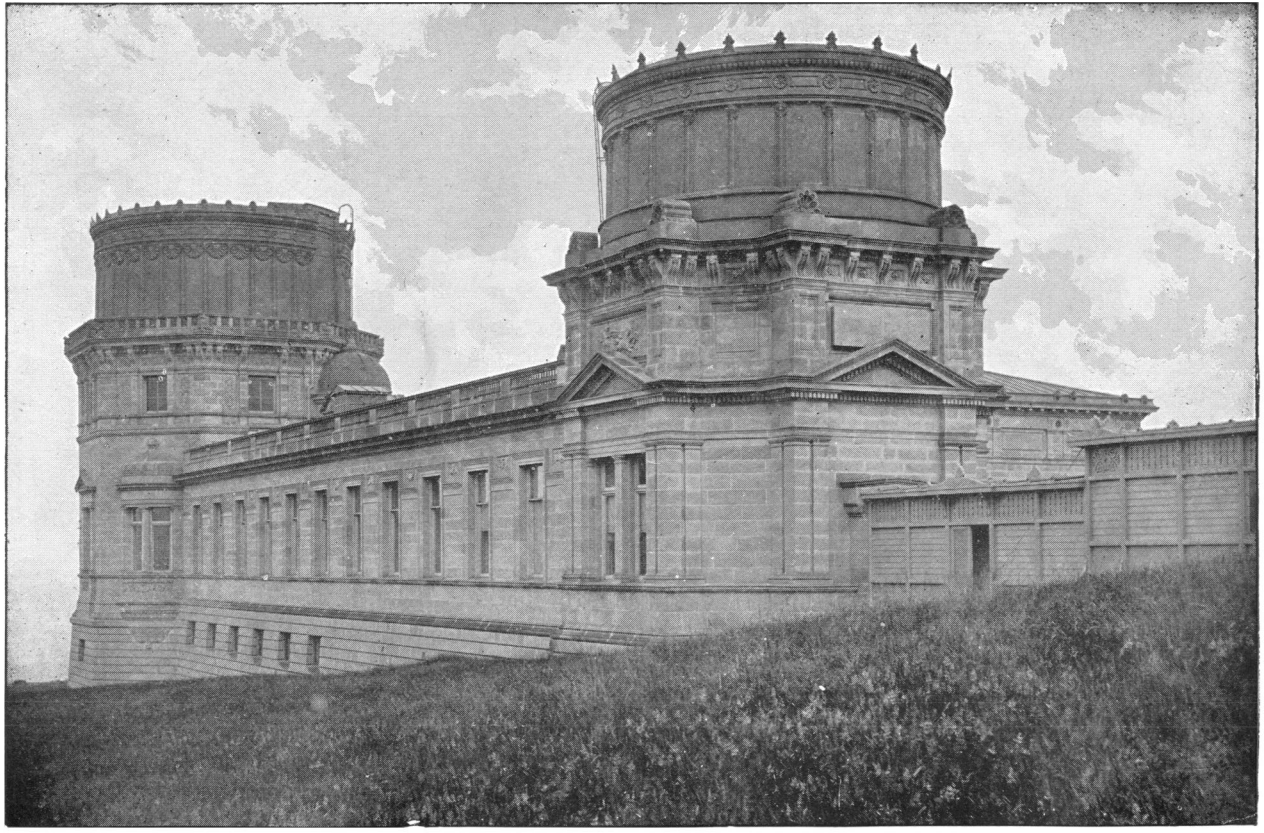
THE 24-INCH NEWTONIAN REFLECTING TELESCOPE.
Royal Observatory, Edinburgh.



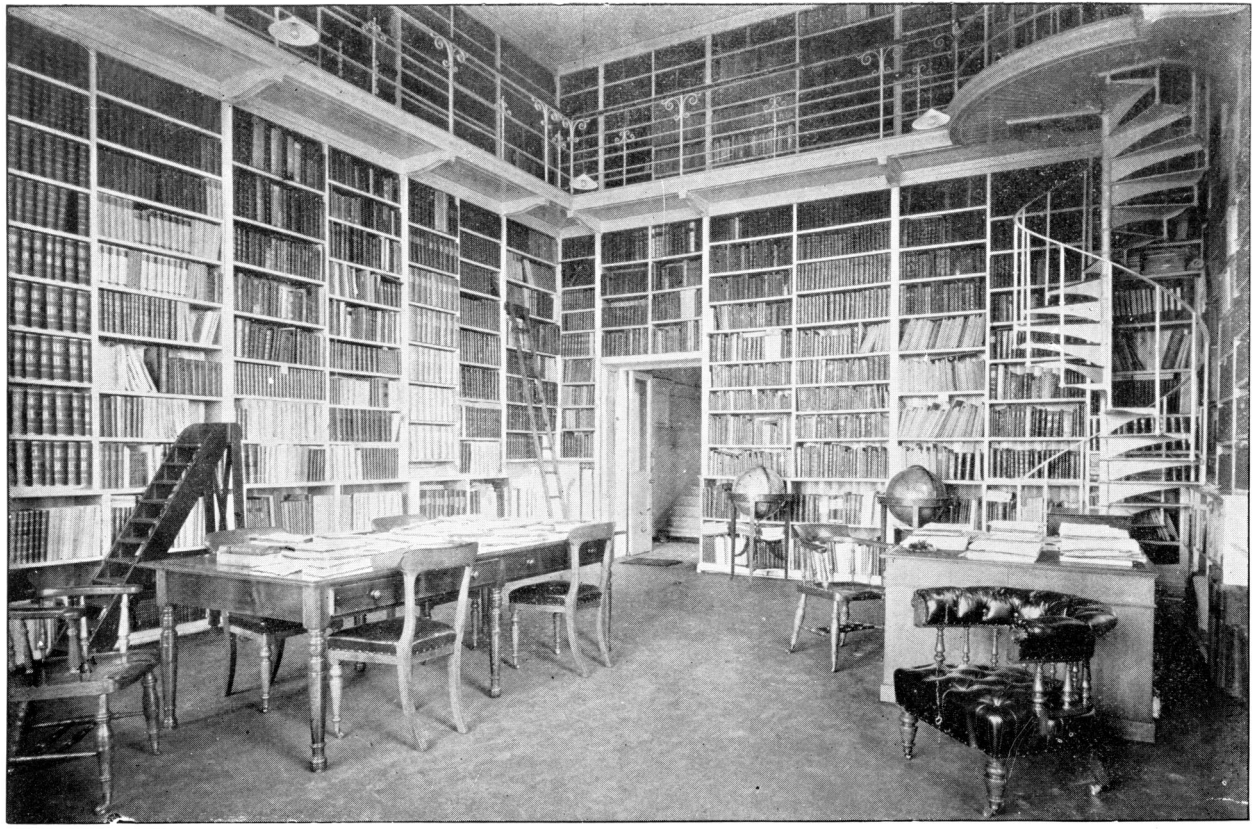
THE TRANSIT CIRCLE, ROYAL OBSERVATORY, EDINBURGH.



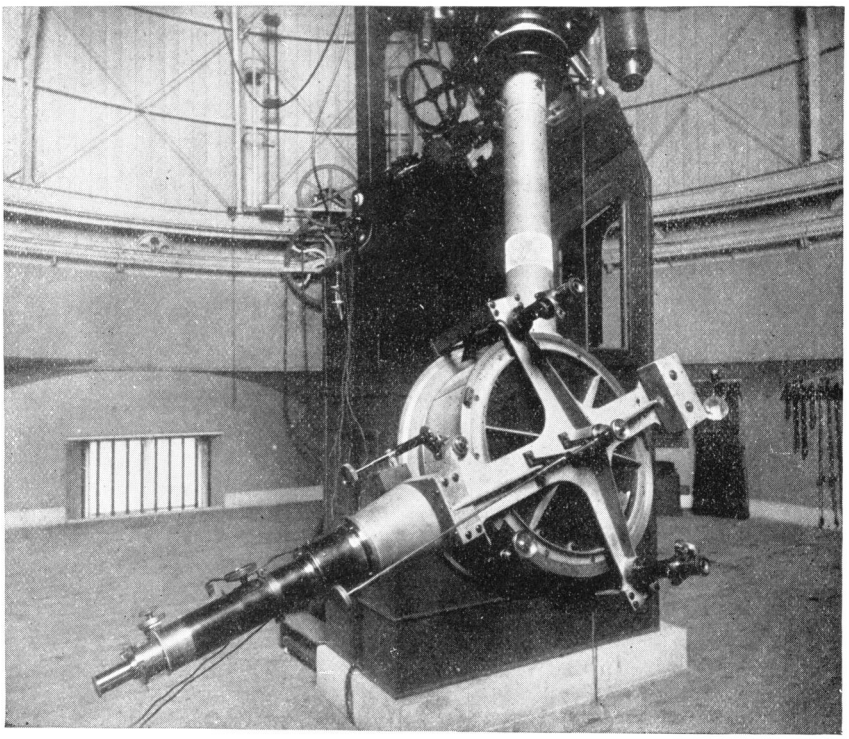
THE EXPERIMENTING ROOM, ROYAL OBSERVATORY, EDINBURGH.



NORTH FRONT OF THE ROYAL OBSERVATORY, EDINBURGH.



THE CRAWFORD LIBRARY, ROYAL OBSERVATORY, EDINBURGH.



THE SPECTROSCOPE ATTACHED TO THE 15-INCH REFRACTOR OF THE ROYAL OBSERVATORY, EDINBURGH.